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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/943,667

08/31/2001

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10417-094001

1120

7590

09/13/2002

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EXAMINER

THOMAS, TONIAE M

ART UNIT

PAPER NUMBER

2822

DATE MAILED: 09/13/2002

5

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/943,667	Applicant(s) KIKUCHI ET AL.	
	Examiner Toniae M. Thomas	Art Unit 2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 August 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) 4-7 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 August 2001 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: |

DETAILED ACTION

Introduction

1. This action is a first Office action on the merits of Application 09/943,667. Currently, claims 1-7 are pending.

Election/Restrictions

2. Applicant's election without traverse of Group I (claims 1-3) in Paper No. 4 is acknowledged. Claims 4-7 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a non-elected invention, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 4.

Drawings

3. Figures 5 and 6 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.
4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference number not mentioned in the description: 5B (fig. 2). A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the

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Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

5. A substitute specification in proper idiomatic English and in compliance with 37 CFR 1.52(a) and (b) is required. The substitute specification filed must be accompanied by a statement that it contains no new matter.

6. The specification is objected to because of the reasons discussed below.

The terms *bipolar structure* and *bipolar transistor* are incorrectly used to characterize MOS field effect transistors (MOSFETs) (page 2, lines 13-18). While a parasitic bipolar transistor is inherent in MOSFET devices, MOSFET devices are not bipolar transistors.

The meaning of the phrase "referring the figure" is unclear (page 10, lines 1-2).

The meaning of the following sentence is unclear: "...the second gate oxide film 8 on the substrate 1 except the part where the gate oxide film 8 is formed is removed" (page 12, lines 1-3). In light of the disclosure, the following change is suggested: "...the second gate oxide film 8 on the substrate 1 except the part where the gate electrode 9 is formed is removed."

The high concentration source region 10 is not formed adjacent to one end of the first gate oxide film 7A as indicated in the written description (page 12, lines 7-11).

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. *Claims 1-3 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.*

It is not clear which low concentration drain region the phrase "said low concentration drain region" refers to (claim 1, line 17): the first low concentration drain region, or the second low concentration drain region.

Regarding the claim language "a high concentration drain region of the second conductive type which is formed in said low concentration drain region having a predetermined distance from the one end of said gate electrode," it is not clear which region has a predetermined distance from the one end of the gate electrode: the high concentration drain region, or the low concentration drain region.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. *Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kadosh et al. (US 5,789,787) in view of Wolf (Silicon Processing for the VLSI Era Vol. 3 – The Submicron MOSFET).*

Kadosh et al. discloses a semiconductor device (see fig. 1O and col. 5, line 38 – col. 8, line 41). The device comprises the following elements: a gate electrode 120 formed on a first conductive type semiconductor substrate via a gate oxide film 126; a first low concentration drain region 142 of a second conductive type, adjacent to one end of the gate electrode; a high concentration source region 172 of the second conductive type, adjacent to another end of the gate electrode; and a high concentration drain region 188 of the second conductive type, which is formed in the low concentration drain region having a predetermined distance from the end of the gate electrode.^{1,2,3}

Phosphorus ions are used to form the first low concentration drain region 142 (col. 6, lines 37-40).

Kadosh et al. lack anticipation only in not disclosing the following element: a second low concentration drain region. Wolf discloses a semiconductor device that is compatible with the device of Kadosh et al. (pages 617-621). The device comprises a first low concentration drain region N- (P), and a second low concentration drain region N- (As) (page 619, fig. 9-46). The second low concentration drain region is formed in the first low concentration drain region so that the second low concentration drain region

¹ The gate oxide film 126 is shown in fig. 1C.

² The examiner used the following definition to define the phrase "adjacent to" as recited in claim 1, line 5: close to; nearby (Webster's II New Riverside University Dictionary).

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is very close to an outer boundary of the first low concentration drain region. The second low concentration drain region is higher in concentration than the first low concentration drain region (page 617, 3rd par.). Phosphorus ions are used to form the first low concentration drain region, and arsenic ions are used to form the second low concentration drain region (page 617, 3rd par. and page 619, fig. 9-46).

The drain structure that Kadosh et al. disclose is a conventional LDD structure. The LDD structure that Wolf discloses is a profiled LDD (P-LDD). According to Wolf, the P-LDD has several advantages over the conventional LDD structure (pages 619-620). One such advantage is a reduction of the maximum electric field in the silicon, as compared to the conventional LDD structure (page 619, 2nd par.).

One having ordinary skill in the art would have been motivated to modify the semiconductor device of Kadosh et al, by providing a second low concentration drain region in the first low concentration drain region, as taught by Wolf, because the profiled LDD structure has several advantages over the conventional LDD structure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Toniae M. Thomas whose telephone number is (703) 305-7646. The examiner can normally be reached on Monday through Thursday from 8:00 a.m. to 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead can be reached on (703) 308-4940. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3432 for regular communications and (703) 305-3432 for After Final communications.

³ The distance of the high concentration drain region 188 from the end of the gate electrode is predetermined by the sidewall oxide 164 and the nitride spacer 178.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JMS

September 8, 2002

Carl Whitehead
CARL WHITEHEAD, JR.
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800